M/037/088

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UTAH DIVISION OF OIL, GAS AND MINING
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Sediment ponds and control

1.)The criterion for sizing of the sediment structures was laid out but no calculations were submitted although numbers were generated. I would like to see the actual calculation numbers for runoff and sediment storage.

2.) Page 2, the discussion of straw bale outlets for the sediment ponds proves to be a questionable alternative. Gravel outlets may be more appropriate and be more functional since straw bale installation is questionable at best and straw bales have never been known to filter much water. It is a strong recommendation that the straw bales be replaced with a 1 inch plus gravel.

3.) Page 2, the discussion of sediment storage being provided below the outlet, would best be supplemented in the plan with an elevation of sediment storage, a commitment to place a marker in the pond at 60% clean out and a maintenance plan.

4.) Please discuss outlet protection for these structures?

5.) What is the reclamation plan for these structures?

Diversion Ditch Detail- Sentinel Pit 1

1.) The operator discusses the surface water profiles that were generated by the computer program Hec-Ras, but the profiles were not submitted. Please provide these profiles. You discuss the fact that you calculated the backwater effects to alleviate concerns regarding the confluence points of the ditches but it is still necessary to provide a drawing showing the plan view addressing what special riprap considerations will be incorporated into these channel conjunction areas to address the impact sites of discharge from the side channels. In the plan the operator discusses the tables used to determine riprap size and that these are found in appendix 1. These are not found in appendix 1. Please provide this information.

2.) The plan called out the following design points (1,2,5,6,7,8,9,10,11,12,13), Table 3, as vegetated channels or excavated to bedrock. The criteria for channel scour is > 1 Foot Per second(fps) for a coarse silt /sand. The calculated velocities for the above channels range from 2.2-6.5 feet per second. It was not described in the plan what vegetation would be used and how the designs were arrived at. This is a very arid environment and vegetated channels may be hard to establish. **Please address the establishment of vegetation in the channels and how this will be accomplished. How will erosion be reduced while vegetation is becoming established(temporary channel lining?)?**

TRY IT

3.) It is recommended in areas of bends or channel junctions of vegetated channels that riprap be placed to prevent excessive erosion. Other areas of concern are the outlets of channel 12 and

13 into channel 11, channel 9 into 10, channel 7 into 6, etc.. Please address these channel junctions and how they will be protected and stable. Any other areas of erosional concern such as outside channel bends must also be protected. Please provide a plan for these areas of concern.

4.) Channel 3 and 4, and 8 discharge into sediment collection structures but the structures do not show an outlet. Where does this water go? Please show this on Figure 1, Diversion System Arrangement.

5.) The operator has not discussed the alternative to building channel 15 and 16 if indeed the northern most reach of the Sentinel Pit 1 is not built. The plan must reflect and show both options. Please show both locations on Figure 1, Diversion System Arrangement and present the appropriate designs.

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Tom Notes

Table 2

LISBON VALLEY COPPER PROJECT
HYDROLOGICAL DESIGN DATA

DIVERSION DITCH DATA

Design Point	Contributing Upstream Ditch	Adjacent Subbasin	Drainage Area (acres)	Peak Flow (cfs)	Ditch Slope (%)	Depth (ft)	Base Width (ft)	Maximum Velocity (fps)
1	None	A	64	50	0.5	2.0	6.0	4
2	None	B	91	70	0.5	2.0	12.0	4
3	None	C	72	56	7.5	3.0	6.0	10.7
4	None	D	77	60	7.5	3.0	6.0	11.0
5	None	E	33	26	0.75	1.5	6.0	3.8
6	None	F	114	88	0.4	2.0	12.0	4
7	5	G	140	108	0.35	2.0	14.0	4
8	6,7	H	358	130	0.6	3.0	6.0	5.7
9	None	I	22	17	0.75	1.5	6.0	3.4
10	2,3,4	J	532	283	0.5	4.0	6.0	6.5
11	None	K	350	147	0.6	3.0	6.0	5.9
12	None	L	5	4	1	1.0	6.0	2.2
13	None	M	159	123	0.6	3.0	6.0	5.6
14	11,12,13	N	602	253	0.5	4.0	8.0	6.3
15	None	O	5115	1155	0.5	7.0	8.0	8.2
16	14,15	P	5734	1295	0.5	7.0	8.0	8.6

Note:

In cases where upstream subbasins contribute to the flow at a design point,
the longest time of concentration for each of the individual contributing subbasins was used.
Additional details in the design at design points 14, 15 and 16 are discussed in section 4.

Table 3

LISBON VALLEY COPPER PROJECT
HYDROLOGICAL DESIGN DATA

DITCH CONSTRUCTION OPTIONS

Design Point	Vegetative Lining	Riprap Lining	Excavation to Bedrock
1			
2			
3		VL Sized	
4		VL Sized	
5			
6			
7			
8		VL Sized	
9			
10		VL Sized	
11		VL Sized	
12			
13		VL Sized	
14		VL Sized	
15		VL Sized	
16		VL Sized	

Note:
1) Shaded cells show the recommended design practice.
2) Channels with half vegetative and half riprap shaded are to be riprapped on downstream half of channel.
3) Any ditch may be excavated to bedrock instead of vegetative lining of riprap where possible.

Diversion Ditches - Sixteen design points, identified by the numerals "1" through "16", along the diversion ditch system are identified on Figure 1. The design points are located at the end of an individual section of ditch, prior to the confluence with the next ditch. Drainage areas, peak flow rates, longitudinal ditch slopes, required depth of the ditches and design velocity data for each ditch are given on Table 2. Drainage areas contributing at each design point include the subbasin area directly adjacent to the ditch plus all subbasins contributing to upstream ditch sections.

Task 2, Lining of Diversion Channels

Scour was a major concern in the design of the diversion channels. The analysis performed by **Hydro-Triad, Ltd.** evaluated the potential for scour of the natural soils and, where required, methods of controlling scour by the use of channel linings.

The scour potential of the existing in-situ soils for use in unlined earthen drainage was evaluated. Resistance of a soil to scour can be related to the properties of the soil. The general soil cover within the project region consists of a loose, silty sand to sandy silt, ranging from 10 to 35 feet deep (Welsh et. al., 1996). Areas with less overburden exist and will be created due to proposed mining operations. Classifications of the soils were derived by others based upon geotechnical testing of site materials. Geotechnical test results of the soil can be found in Appendix A of the design report (Welsh et. al., 1996).

For a coarse silt/fine sand, velocities in excess of 1.0 fps generally cause scour (Kinori, 1977). All of the predicted velocities at design flows greatly exceed this range and would therefore result in considerable scour of these soils. Because the natural soils would be scoured given the design flows, lining the channels with more scour resistant materials was determined to be necessary for the design.